

Conference Abstract

Integrated Collection and Publication of Sample Metadata in JAMSTEC: A System Maximizing Sample Values and Assisting in Sample Management

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Abstract

The Japan Agency for Marine-Earth Science and Technology ([JAMSTEC](#)) has collected a lot of samples (e.g., organisms, rocks, sediment cores) from the deep sea, seafloors and other extreme environments. These samples are difficult to collect again by JAMSTEC and other institutions because of their remoteness, so we thought it important to make them available to as many people as possible for a variety of purposes. JAMSTEC established the “[Basic Policies on the Handling of Data and Samples](#)” in 2007, and its data management office (DMO) has operated a centralized management and publication of metadata for almost all samples collected during research cruises (Tsuboi et al. 2014). While researchers who collected samples retain priority rights of use, publishing the metadata opens the door for third parties to apply for sample usage. To properly manage and publish those metadata of the samples, DMO has constructed and operates databases, including the JAMSTEC Sample Database for sample management and the [DARWIN](#) database for the publication of cruise data and sample metadata. Some biological sample metadata is also shared with JAMSTEC’s biogeographic database

([BISMaL](#)), and global databases such as Ocean Biodiversity Information System ([OBIS](#)) and the Global Biodiversity Information Facility ([GBIF](#)) (Iseto et al. 2019; Fig. 1).

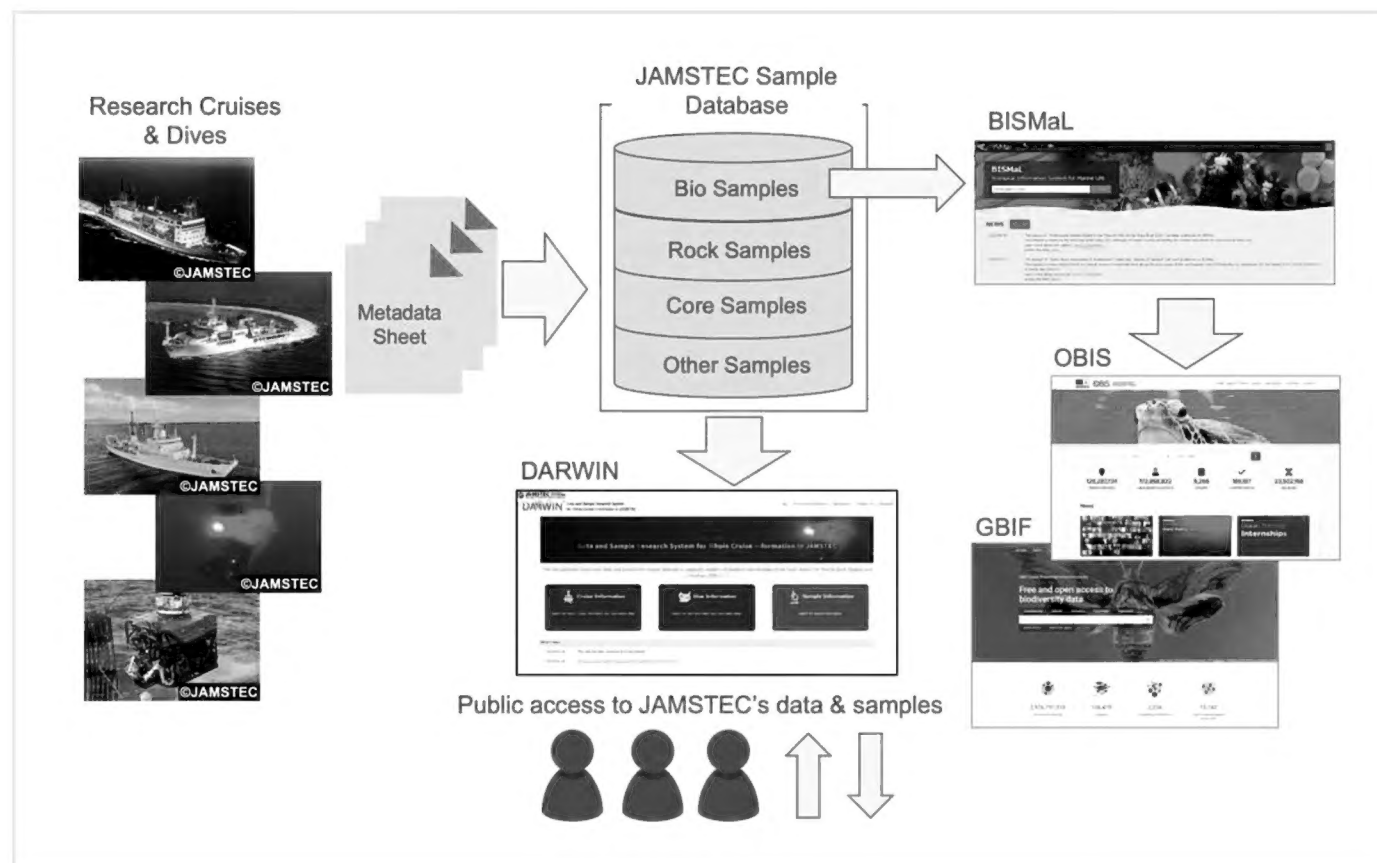


Figure 1.

Overview of JAMSTEC's sample management.

Soon after the research cruises, metadata of almost all collected samples are submitted to DMO using JAMSTEC's standardized metadata sheets and registered into JAMSTEC Sample Database for sample data management. The project members of the research cruises and dives can use the samples for their own research. Among them, JAMSTEC members can also access the database to update the metadata and add data related to the samples as part of their own research management. The sample metadata are also sent to public databases including DARWIN, a database of JAMSTEC, which acts as the help dest for JAMSTEC's data and samples. Biological sample metadata, if it contains both location and identification information, is also provided to the Biological Information System for Marine Life ([BISMaL](#)), which then provides it to OBIS and GBIF.

Traditionally, researchers have deposited selected samples in museums or resource centers and made that information public through literature or via online databases. However, the samples accessible through these routes represent only a small portion of the total samples collected by researchers. What JAMSTEC does is different from this, in that JAMSTEC publishes metadata of most collected samples (Fig. 2).

JAMSTEC manages sample metadata not only to respond to sample requests from third parties, but also for its own benefits. The sample management assists JAMSTEC's research in collaborative opportunities, sample inheritances, and research compliance. Most notably, among recent global regulations, proper sample management has become essential to complying with diverse treaties and laws such as [Security Export Control](#) and [Nagoya Protocol on Access and Benefit Sharing](#).

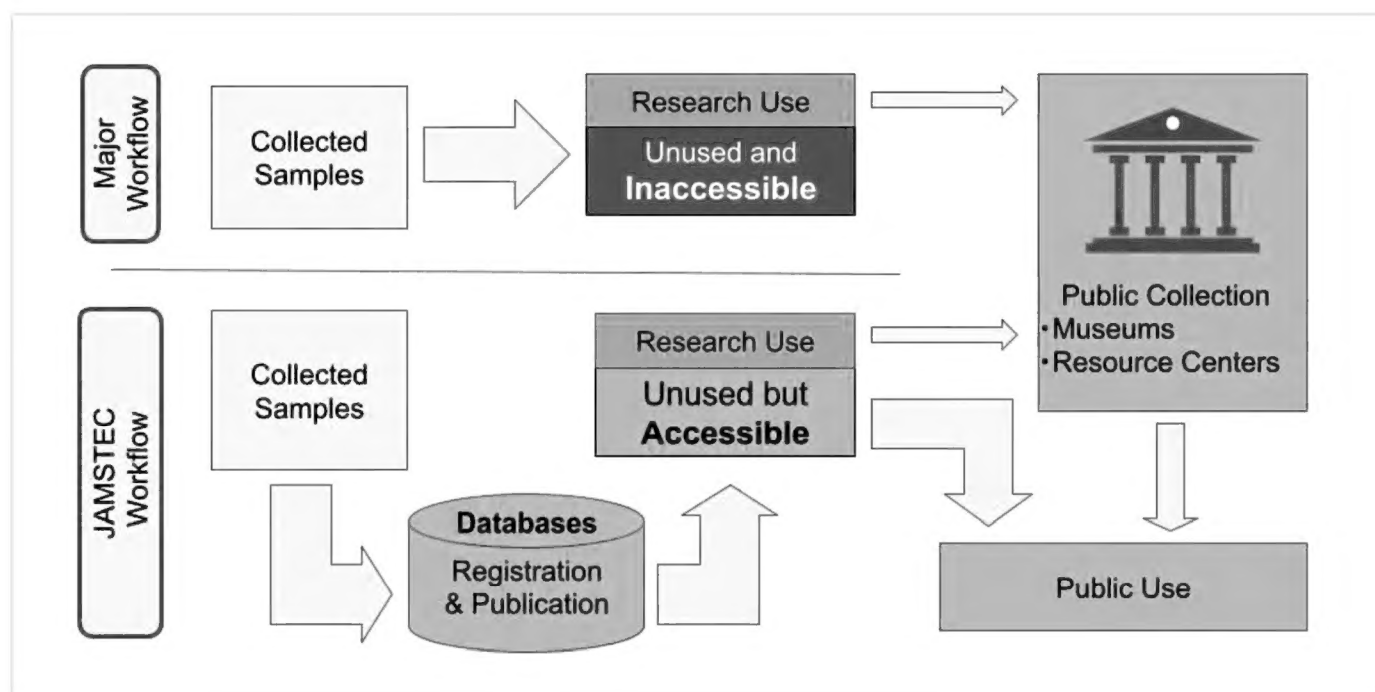


Figure 2.

Comparison of sample management workflows in major institutions and JAMSTEC.

In JAMSTEC, almost all collected samples are registered in a database before collectors use them for their own research. In both workflows, collector's research activities are the same (orange boxes). However, in the major workflow, many samples are inaccessible and likely to remain unused (dark gray box), except the samples deposited in the museums or resource centers. In JAMSTEC workflow, almost all samples are accessible to the public. Blue boxes indicate the factors that facilitate extended sample use.

Now that we have established this system, we are moving to the next stage, where each JAMSTEC researcher can register and update their own sample metadata, and control public settings of the sample metadata themselves on the database without relying heavily on DMO.

We hope that the JAMSTEC initiative will become a revitalizing model for sample-based research.

Keywords

biological sample, rock sample, sediment core sample, policy, public accessibility, dead stock samples, security export control, Nagoya Protocol, ABS

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Conflicts of interest

The authors have declared that no competing interests exist.

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